

Development and updating the system to discover pleasure and aspiration in society

Progress until FY2022

1. Outline of the project

We aim to develop a system that utilizes Virtual Reality (VR) technology to create virtual experiences to maximize personal subjective pleasure and aspirations from the perspectives of welfare and agency. We conduct work in modeling the interrelationship of aspirations and joy in mobility experiences, establishing mathematical methodologies for discovering joys and aspirations that connect to individual welfare and agency, and building a framework for discussing the optimization of experiences from an individual to a group level. By integrating these, we aim to realize a support system that allows users not to overly depend on services provided by AI systems but actively engage in social activities of their own volition.



Figure 1. Developed VR experience provider and recorder

2. Outcome so far

When designing virtual experiences in a VR space, it's necessary to mathematically grasp the user's psychological state (aspirations and pleasure) to determine what kind of content (visual and audio signals) the system should provide - a system design theory is needed. As a foundation for establishing this design theory, we built a system capable of uniformly recording VR content visuals, audio, user biometric data (gaze, pupil diameter, skin potential, heart rate, electrocardiogram, brain measurement data), and full-body movement data (Figure 1).

Furthermore, in collaboration with the members of Research and Development Project 3-2 using the above platform, we built an experimental system to analyze mobility experiences related to aspirations and joy through travel in VR space. Specifically, we used a VR walking device that allowed actual movement in VR and created a VR application to tour six tourist spots (Figure 2). To investigate the impact of mobility experiences on memory, we built a feature that allows for photo taking on a smartphone during VR travel. This provides for retrospectively looking back on memories and establishing a system foundation for evaluating proactive actions.

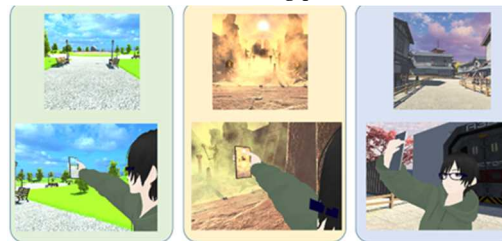


Figure 2. VR travel application

3. Future plans

We conduct experiments with VR travel content, recording conditions where visual imagery in VR space, walking behaviors, dialogue, and proactive actions appear. We also collect biometric data and brain activity data. We analyze these data to separate trends common to all users and trends corresponding to the mindsets of individual users and model the relationships between presented data and behavioral data in each mindset. This allows us to mathematically express the joy and aspirations that each user subjectively feels, and we aim to build a system that can dynamically customize VR content.

Research on behavior change technology through VR is expanding globally; however, many aspects of its impact on the heart remain unclear, leaving us without a comprehensive theoretical framework. In the future, using the dataset collected with the platform we've built and applying the Free Energy Principle(*), we aim to build a framework for mathematically discussing what kind of VR experiences should be presented to make appropriate experiences for individual users by modeling the interrelationship between aspirations and joy at an individual level.

Through such efforts, we aim to realize an assistive system that can provide VR experiences that support the discovery of appropriate joy and aspirations for individual users to support a well-being society in 2050.

(* An information-processing model of the brain proposed by Karl Friston, which hypothesizes that the brain performs to minimize the free energy, and it is expected to be able to explain well-being mathematically.)

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